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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/776,059 | 02/02/2001 | Jongho Lee | 4591-170 | 9369 |
| 20575 | 7590 | 06/08/2004 | EXAMINER | |
| MARGER JOHNSON & MCCOLLOM PC 1030 SW MORRISON STREET PORTLAND, OR 97205 | | | WILLE, DOUGLAS A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2814 | |

DATE MAILED: 06/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/776,059

Applicant(s)

LEE ET AL. 

Examiner

Douglas A Wille

Art Unit

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspond nc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 and 42-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-25, 48 and 49 is/are allowed.
- 6) ☐ Claim(s) 1, 2, 4-11, 42-46, 50-58 is/are rejected.
- 7) ☒ Claim(s) 3, 12-19 and 42 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 2, 4, 6, 7, 9 – 11, 42, 45, 46, 50, 51 and 54 - 58 are rejected under 35

U.S.C. 102(a) as being anticipated by Callegari et al.

3. With respect to claims 1, 4, 6, 50 and 51, Callegari et al. show multilevel structure (see Figure 12H and column 11, line 23) with an interface layer 55 that can be hafnium silicate and a high k dielectric 56 which can be aluminum oxide.

4. With respect to claim 2, the Hf silicate has a higher dielectric constant than silicon nitride.

5. With respect to claim 7, Callegari et al. show the use of ALD or CVD for other examples (see example 2) but do not specify the technique to form the device of example 5; however processing limitations carry no weight in claims drawn to a device.

6. With respect to claims 9 and 10, the high constant layer is aluminum oxide.

7. With respect to claim 11, the high constant layer is aluminum oxide. Callegari et al. show the use of ALD or CVD for other examples (see example 2) but do not specify the technique to form the device of example 5; however processing limitations carry no weight in claims drawn to a device.

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8. With respect to claim 42, Callegari et al. show multilevel structure (see Figure 12H and column 11, line 23) with an interface layer 55 that can be hafnium silicate and a high k dielectric 56 which can be aluminum oxide and S/D regions are shown.

9. With respect to claims 45, 46, 54 and 55, Callegari et al. show the application to capacitor structures (see example 8).

10. With respect to claims 56 – 58, Callegari et al. show a capacitor application (column 3, line 17).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 5, 8, 44, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Callegari et al.

13. With respect to claim 5, Callegari et al. do not specify x for the silicate but since criticality has not been established it would be a matter of routine experimentation to select an appropriate value for a given application.

14. With respect to claim 8, since Callegari et al. shows the equivalent thickness (column 9, line 5) it would be obvious to select any value meeting design requirements.

15. With respect to claim 44, since it is known in the art to form floating gate devices, it would be obvious to use the Callegari et al. technique to form these devices since the same design requirements exist.

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16. With respect to claims 52 and 53, Callegari et al. show multilevel structure (see Figure 12H and column 11, line 23) with an interface layer 55 that can be hafnium silicate and a high k dielectric 56 which can be aluminum oxide.

Allowable Subject Matter

17. Claims 3, 12 – 19 and 47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. With respect to claims 3 and 12 Callegari et al. do not show the high dielectric layer as being the same as the silicate layer or show that the high k layer has a greater k than the silicate layer.

19. With respect to claims 13 – 19 Ma et al. show a multilayer stack of aluminum oxide and hafnium oxide but do not show the base silicate layer.

20. Claims 20 – 25, 48 and 49 are allowed.

21. Ma et al. show a multilayer stack of aluminum oxide and hafnium oxide but do not show the base silicate layer and therefore do not show that the high k layer has a k greater than the silicate.

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

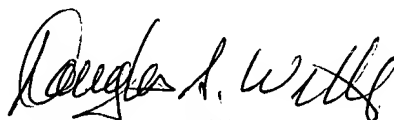
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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas A Wille whose telephone number is (571) 272-1721. The examiner can normally be reached on M-F (6:15-2:45).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Douglas A. Wille
Primary Examiner